

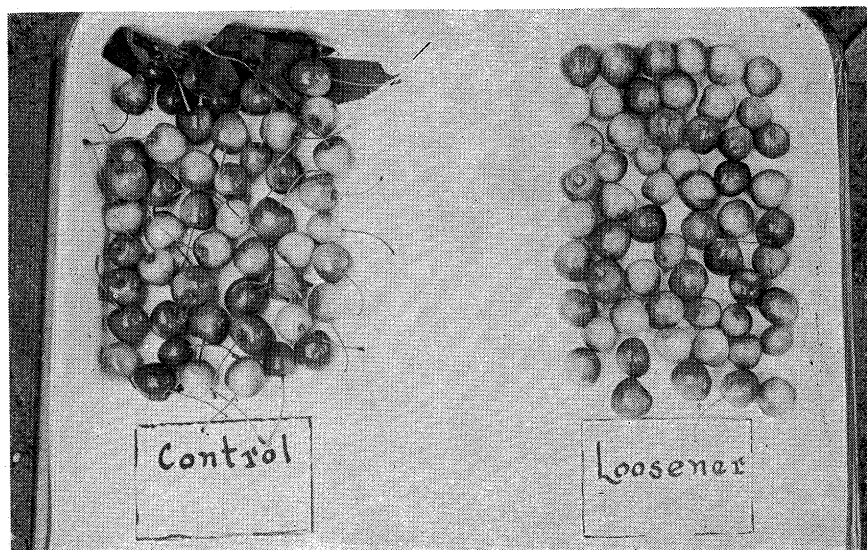
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Sweet Cherries: Abscission Chemical Aids Mechanical Harvesting

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Many Michigan fruit growers raise both sweet and tart cherries. About 85 percent of the tart cherries are now harvested mechanically. Can growers use the tart cherry harvesters also to bring in the sweet cherry crop?

In 1969 the machines harvested most of the sweet cherries (Schmidt variety) that were canned in syrup (about 25 percent of the Michigan crop). However, only about 3 percent of the cherries that were brined (Michigan's principal outlet) were harvested by machine. Great difficulty was experienced in separating the brining cherries (Napoleon, Emperor Francis, Windsor varie-



Ethrel-treated cherries (right) had advantages in stem counts, trash content and bruise level.

ties) from the trees.

Accordingly, in 1969 a research team comprising a grower, a processor, and research scientists sought practical means of increasing the recovery of brining cherries during mechanical harvest. They tested the effectiveness of Ethrel (2-chloroethylphosphonic acid, an abscission promoting chemical) under a varie-

ty of conditions in the Traverse City area of Michigan. Measurements were made of fruit recovery, processing characteristics, and fruit quality. A complete picture of the effects of Ethrel was obtained by following the cherries from the tree to the consumer.

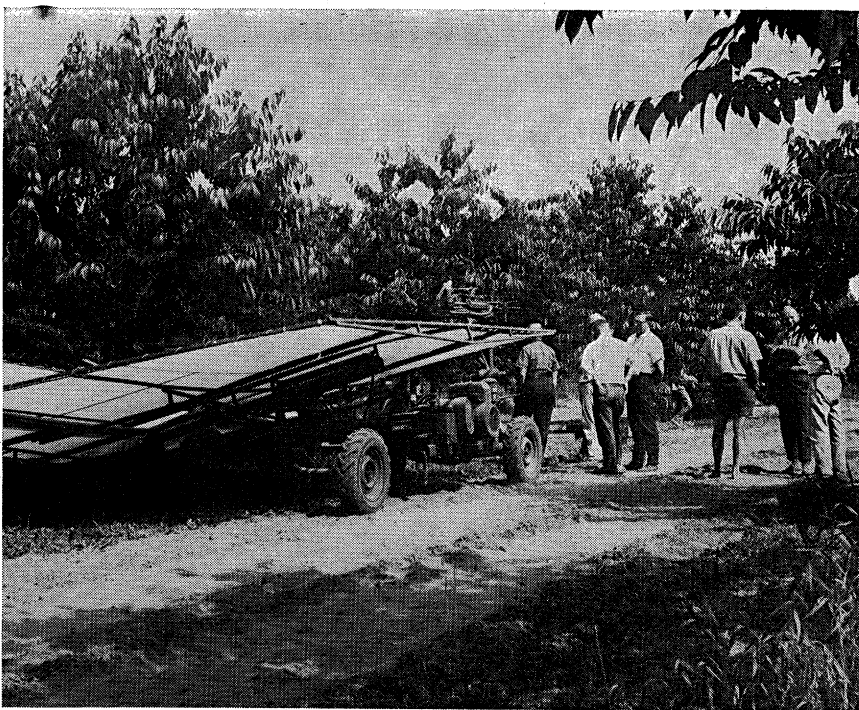
Spraying Windsor and Emperor Francis trees with Ethrel eight days

prior to harvest greatly increased the recovery of fruit during harvest. For instance, when 500 parts per million (ppm) of Ethrel was used, fruit recovery increased from 76 to 92 percent with the Emperor Francis variety, and from 70 to 88 percent with the Windsor variety. Increasing the concentration of Ethrel to 1000 ppm did not significantly increase fruit recovery.

Ethrel treatment speeded up the overall harvesting operation by shortening the shaking period required for fruit removal. At the same time the short shaking period gave two additional and meaningful advantages: (1) bruise damage to fruit was reduced, and (2) the number of leaves removed from the tree during the shaking period was cut. Ethrel loosened the fruit without loosening the leaves. Harvested fruit was relatively free of trash and had relatively few attached stems. The Ethrel treatments caused no abnormal dropping of cherries prior to harvest.

Ethrel acted quickly, producing a significant effect in about a week after treatment. For instance, eight days after treatment recovery of Emperor Francis cherries was 92 percent, while the value for untreated control cherries remained at 76 percent. Permitting the chemical to act for 11 and 14 days before harvest resulted in recoveries of 96 and 98 percent, respectively. The differences, however, were not statistically significant. All cherries were harvested on the same date, and the spray treatments were made on different dates prior to harvest.

After mechanical harvest, cherries were weighed and placed in brine in the orchard. They were held in brine for 74 days, after which they were graded by four processors. All samples were commercially acceptable, and in all cases Ethrel treated lots were at least equal to untreated lots in quality and firmness. Treated lots tended to show less stem-end tearing than did control lots. No significant differences in the amount of shrinkage in brine were observed, with the exception that samples having stems attached showed considerably less shrinkage (10.0% vs. 17.3%) than samples having stems removed. Yield of pitted product is a matter of major concern to processors. If a



Mechanical harvesting of Ethrel-treated sweet cherries.

new treatment in the orchard benefits the grower, it is desirable also for the treatment to do no harm to the processor. Fortunately, in the present tests Ethrel treatment in the orchard caused no decrease in the yield of pitted fruit in the processing plant. In fact, a small (non-significant) increase was shown by the data. Average yield for untreated lots was 63.8 percent (based on weight of original cherries in the orchard), and the corresponding value for lots treated with 1000 ppm of Ethrel was 66.5 percent.

The brined and pitted cherries were washed, infiltrated with syrup, flavored, and colored by standard commercial procedures. No changes in procedures were required to accommodate the Ethrel-treated fruit. The finished products, maraschino cherries, were graded by processors. No differences in grade attributable to Ethrel treatment were observed. All lots of the Emperor Francis variety, and two-thirds of the Windsor lots, rated good to excellent in quality.

Ethrel promotes abscission by sup-

plying ethylene, a nontoxic ripening agent that occurs naturally in the tissues of most fruits. Residues from the decomposition of Ethrel appear to be harmless. At present Ethrel has not been cleared by Food and Drug Administration for commercial use. The necessary steps for clearance, however, have been taken, and expectations are that clearance will be granted in the future.